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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 26, 1932

It Will be Over in Five Minutes

See Page 338

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Edited by WATSON DAVIS

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DO YOU KNOW THAT

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A European idea of renting electrical appliances to householders is being tried out in this country.

An analysis of 1,328 magazines printed in the Soviet Union in 1930 showed practically one-third to be scientific.

Pointing out that not all rodents are harmful, a zoologist mentions grasshopper mice, which feed almost entirely on insects.

Tests indicate that babies respond to colors at three months of age, but do not distinguish different colors until twelve to fifteen months.

A National Historical Grove of trees from historic places has been established at Washington, D. C., by the American Forestry Association.

Government tests have shown pecan growers that the injury known as black pit is caused by insects and not by a disease organism as was supposed.

A house being excavated at Verulamium, the old Romano-British city near St. Albans, England, is found to have had an elaborate central heating system.

A zoologist says that in Africa many kinds of animals sometimes gather at the waterholes and wait their turn to drink with amazing patience, even courtesy.

Research has developed a new waterproof silk for raincoats, said to have superior resistance to heat and cold and cleaning.

The first new mineral discovered by X-ray methods has been named braggite, in honor of Sir William Bragg, noted scientist.

At the beginning of the twentieth century, almost none of the milk sold in the larger American cities was pasteurized; now almost 90 per cent. is.

Grapes from fifteen different foreign countries are being tested at the University of California in the search for new varieties suitable to grow in that state.

A report from London announces a new process by which plastic materials and electrical insulation can be made from waste leather, seaweed, and certain vegetable fibers.

WITH THE SCIENCES THIS WEEK

Curiosity arousing questions for the teacher and general reader. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

ANTHROPOLOGY

What is the estimated age of the "earliest American girl?" p. 335. *Ancient Americans—Emily C. Davis—Holt, 1931, \$3.50.*

ARCHAEOLOGY

Did Eskimos make the stone ceremonial lamp found in Alaska during the past summer? p. 336.

What birds did Arizona Indians eat 1,000 years ago? p. 335

ASTRONOMY

How far from the earth are the 300,000 southern sky galaxies being studied by Harvard? p. 337. *Kosmos—W. de Sitter—Harvard Univ. Press, 1932, \$1.75.*

How much radiation is given off by a star twice as big as the sun? p. 336.

ASTRONOMY-RADIO

Which of the two ionized layers of upper atmosphere do meteors affect? p. 335. *Meteors—Charles P. Olivier—Williams and Wilkins, 1925, \$6.*

BOTANY

What wild shrubs has the white pine blister rust made allies of? p. 346.

FORESTRY

How tall was the Douglas fir which may have been older than Sequoias? p. 337.

GENETICS

What scientific importance has the jimson weed acquired? p. 337.

MEDICINE

What plasticizer has become important medically? p. 346.

MINING-ARCHAEOLOGY

From what mines did Egypt and Babylon get metals for bronze? p. 341.

PALEONTOLOGY

What is the name of the ancestor of all dinosaurs? p. 340. *Animals of the past—Frederic A. Lucas—McClure, Phillips & Co., 1902, \$2.*

When and where did the horned gopher live? p. 342.

PATHOLOGY

What disease may have aided the extermination of the wild heath hen? p. 340.

PHYSICS

How does Dr. Delbruck make protons and neutrons explain cosmic ray's peculiar behavior? p. 346.

PHYSIOLOGY

Does cancer attack heart muscles? p. 341.

PSYCHOLOGY

Are there geniuses and morons among rats? p. 336.

What is the best way to combat temper tantrums in children? p. 338. *Anger in Young Children—Florence L. Goodenough—Univ. of Minnesota, 1931, \$2.50.*

PUBLIC HEALTH

Where has protein-deficient dropsy been breaking out? p. 335.

ANTHROPOLOGY

Earliest American Girl May Have Met Violent Death

Well Preserved Ice Age Skeleton With Injured Shoulder Blade Shows More Ape-Like Traits Than Modern Woman

VIOLENT DEATH, perhaps even a murder of passion, ended the brief career of a seventeen-and-a-half-year-old girl who promises to become America's most famous prehistoric inhabitant, after having been covered by glacial silts for some twenty thousand years. Her youthful skeleton, marvelously preserved, may clinch the argument for the existence of ancient peoples in America.

Dr. A. E. Jenks, University of Minnesota anthropologist, described the death of the ancient Indian maiden when he laid before the National Academy of Sciences in Ann Arbor a detailed report on what was appraised as "one of the best authenticated finds in North America."

In the historically remote days when a great ice sheet covered northern North America, there lived in prehistoric Minnesota this girl who is now the center of discussion by scientists. She was mongoloid in her features and her rounded nose openings indicate a closer relationship to the apes than is the case with modern women.

Little she cared about these scientific facts to be deduced by racially remote scientists of a future of which she did not dream. The rigors and pleasures of primitive life undoubtedly occupied her existence until her death.

How she was killed is suggested by Dr. Jenks' investigations which if the death were more recent would be presented before a coroner's jury instead of to the court of scientific opinion.

The Minnesota maid was about a half mile from the shore of an ice age lake that has since dried up. Probably she was on a raft or in a canoe. An arrow, or perhaps a spear, was projected toward her and its point entered her bosom, piercing the right lung and perhaps entering the heart, causing instant death. The mortal blow was struck from the front, not behind her back. Dr. Jenks knows this from a gouge in the right shoulder blade of the youthful skeleton.

She toppled over into the water, sank to the depths, and the mud and silt of

years sealed her bones into a natural grave which was disturbed only twenty millennia later, when Minnesota road repairers dug out her skull and skeleton.

Who wielded the weapon will never be known, nor has the weapon been recovered. But shell ornaments to hold her hair and others with a sexual significance found with her skeleton undoubtedly adorned her. An antler dagger found nearby may have been carried by her at the time of her death.

Dr. Jenks was called into this investigation when a ditching machine on a state highway in Ottertail County, Minnesota, exposed the (*Turn to Page 342*)

PUBLIC HEALTH

Dropsy Outbreaks Traced To Protein-Deficient Diets

EPIDEMICS of dropsy, or edema, have been occurring regularly at certain seasons in Tennessee, Dr. John B. Youmans of Nashville reported to the

ASTRONOMY-RADIO

Meteors Cause Reflection Of Short Wave Radio Signals

By **DR. A. M. SKELLETT**, radio research engineer for Bell Telephone Laboratories.

DURING the Leonid meteor shower which occurred on the night of November 15-16 radio pulse measurements were made at the Bell Telephone Laboratories at Deal, N. J.

In the opinion of J. P. Schafer and W. M. Goodall, who carried out these tests, the results confirm my theory that meteors cause sufficient ionization in the layers of the upper atmosphere to reflect short wave radio signals.

It is a well-known fact that there are two ionized regions which reflect short wave radio signals. Coincident with the

American Society of Tropical Medicine. The condition seems to be the result of a diet low in calories and in proteins. This diet is more the result of habit and custom than it is of poverty, Dr. Youmans said.

"In itself the edema probably causes little harm," he said, "but the chronic starvation, particularly of protein, that it apparently represents may cause serious disorders.

"The principal remedy is to be found in public health education, in which more attention should be paid to diet."

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ARCHAEOLOGY

Arizona Indians Ate Turkey 1000 Years Ago

ARIZONA Indians ate turkey nearly a thousand years ago. They also ate hawks, owls, coots and robins as well as the more appetizing quail, if bones found in two Arizona ruins dating between 1000 and 1100 A.D. are any criteria. The bones were found by Lyndon L. Hargrave of the Museum of Northern Arizona, and identified by Dr. Alden H. Miller of the University of California Museum of Vertebrate Zoology. The turkeys, Dr. Alden says, could have been obtained by the Indians in the neighborhood of the San Francisco Peaks, a prominent mountain range in Arizona.

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occurrence of visible meteors overhead, the ionic density of the lower layer was often observed to increase. This ionization was usually found to last from twenty seconds to two minutes; at times, much longer.

The same investigators had previously made observations during all the more important meteor showers of 1931 and 1932, but unfavorable weather conditions had prevented a direct correlation between the measured increases in ionization and the passage of meteors overhead. This correlation has now been obtained, although at times during the night clouds obscured part of the sky.

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ASTRONOMY

Sun Not Much Older Than 7.55 Million Million Years

THE AGE of the sun cannot be much more than 7.55 million million years. So declares Dr. Ludwik Silberstein, research physicist of the Eastman Laboratories at Rochester, N. Y., in *Scientia*.

Dr. Silberstein bases his conclusions on a mathematical study of astronomical researches made in part by other scientists. The luminosity of a star is proportionate to the cube of its mass. That is to say, a star twice as big as our sun gives off not merely twice as much radiation, but eight times as much. The older a star grows, the smaller it gets, because it is all the time converting its matter into energy and radiating the energy away. But the smaller it gets, the more slowly it shines itself away, by that same rule of the cube. When the sun shall at last have dwindled to one-half its present mass, it will be radiating only one-eighth as much energy.

4,200,000 Tons a Second Lost

The mass radiated away by the sun at present is 4,200,000 tons per second; the sun's mass in tons is expressed by a 2 followed by 27 naughts, Dr. Silberstein says. The application of a suitable mathematical formula to these two figures gives 7.55 million million years as the sun's age.

"If we know the present mass of a star," Dr. Silberstein continues, "the equation enables us to predict what its mass will be at any future time and, reaching back into the past, to tell how much time has elapsed since the star had a mass so or so many times greater than now. Thus, for example, if we ask what time has elapsed since our sun had twice its present mass (if such ever was the case), the answer is 5.66 million million years. Similarly, for the time since the sun had 4 times and 10 times its present mass (again if this was ever the case) we find 7.08 and 7.47 million million years respectively.

We see, incidentally, that these figures differ less and less from each other and approach very rapidly indeed the original time-coefficient, viz. 7.55 million million years, and the remarkable thing is that even if we asked about a hundredfold, a thousandfold mass, and so on, we would never exceed that length

of time (T) which thus is the upper limit of the sun's age, if we are yet to keep to our concrete example. In plain English, the sun as such cannot be older than 7.55 million million years. If we asked what mass the sun had before that time, say 8 billion years ago, the equation would give us an absurd answer, an imaginary mass, as a mathematician would put it."

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ARCHAEOLOGY

Stone Ceremonial Lamp Found in Alaska

A STONE LAMP, with a human figure in an attitude of prayer carved in full relief in the bowl, is the prize of prehistoric Eskimo art brought back from Alaska by a woman archaeologist. The archaeologist, Miss Frederica de Laguna, has just returned from an Alaskan expedition to Kachemak Bay, Cook Inlet, where she excavated a prehistoric village site for the University of Pennsylvania Museum.

The stone lamp is the outstanding find of the summer's digging, in Miss de Laguna's estimation. Five other lamps with carved human figures inside them have been found in Alaska. This is the first to be unearthed from its old

PSYCHOLOGY

Rats More Clever Than Humans At Escaping From Labyrinth

RATS when lost in a labyrinth find their way out faster and more intelligently than many human beings would under similar conditions, Prof. John F. Shepard, University of Michigan psychologist, told the National Academy of Sciences. But he observed that there are rat geniuses and morons, just as among men and women there are many different grades of intelligence.

Ears aid rats in their repeated travel-



AT PRAYER IN A LAMP

resting place by a scientific expedition. The origin of the lamps has been a matter of mystery, for stone carving has not been considered an Eskimo technique.

"The carved lamp, together with a small, plain one, were found in a house pit," said Miss de Laguna, describing the discovery to Science Service. "The house was evidently in ruins at the time the lamps were cached.

"The decorated lamp must have been made for ceremonial use. The figure of the man, sitting with hands spread out in front of him, with face upturned and closed eyes, is evidently in an attitude of prayer. The carving of the features is very fine, and the lamp itself is beautifully finished."

The lamp was unearthed in a thick shell heap so close to the sea that high tide washes over the place. The land there has sunk, but in earlier times it was the site of a series of five different settlements.

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ings through a maze of blind alleys and unusual turnings. They seem to remember the sounds of the floors over which they scurry. Prof. Shepard was forced to insulate the rat-runs with sand and rubber to make them sound alike. Although cheese is the proverbial rat bait and rats do like it, Prof. Shepard found that rats do not have a keen sense of smell and their noses do not guide them to cheese-baited traps.

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GENETICS

Knowledge of Chromosomes Founded Synthetic Species

With Radium and X-Ray Scientists Direct Formation of New Weeds According to Given Specifications

CHARLES DARWIN would have greeted with satisfaction the report of the planned and synthetic "origin of species" that Dr. Albert F. Blakeslee presented to the National Academy of Sciences meeting in Ann Arbor.

Three new species of a common weed were manufactured to order as the result of the research of Dr. Blakeslee and Dr. Dorothy A. Bergner at the Cold Spring Harbor, N. Y., genetics laboratory of the Carnegie Institution of Washington.

These new kinds of jimson weed, more scientifically known as *Datura*, have no economic use, but they are far more important to the future of plant and animal breeding than the new plants that are being protected under the liberalized patent laws at Washington.

Not chance alone but careful knowledge of the chromosomes within the cells of the plants enabled Dr. Blakeslee to draw up specifications for the new species of jimson weed and then guide their production. Radium and X-rays directed at the seeds and germ cells of plants and animals have greatly increased the number of new types produced. But with a hit-or-miss production of mutations, as the scientists call the new type, it is largely a matter of luck when a new kind of plant or animal is produced.

From years of growing jimson weed as a florist would grow prize flowers, from microscopical studies of the little chromosome rods in the cells, Dr. Blakeslee knows the effect upon the adult plant of extra doses of the various parts of the chromosomes. He can predict what the effect will be when extra chromosomal fragments secured by radiation treatment are added to the normal arrangement.

Knowing what changes in the chromosomes are needed to give new shapes to the leaves or fruit or to produce other changes, he can predict just what characters a new arrangement of chromosomes will have. To make the new kind of

weed breed true, he knew that these new chromosome arrangements must be transmitted by the pollen or male element of the plant as well as by the egg cells or female part.

Dr. Blakeslee told the Academicians that three new kinds of jimson weed he has made are indistinguishable in ordinary appearance from each other, and they are strikingly distinct from the stock from which they are evolved. He believes therefore that they merit being called new species. They stand the biological test for new species because they breed true and they differ more widely from the normal jimson weed than do some natural species that have already been given a place as species in the classifications.

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ASTRONOMY

300,000 Galaxies Studied by Harvard

THREE hundred thousand heavenly galaxies, each a great system or "universe" of stars similar to our own Milky Way, will be disclosed in the southern skies photographed by Harvard's 24-

inch Bruce telescope stationed in South Africa.

Dr. Harlow Shapley, director of the Harvard College Observatory, in a paper to the National Academy of Sciences, estimated that these external galaxies would be discovered in the course of a research program to be completed in about six years.

Most of these great systems of stars probably lie within a region between thirty million and one hundred million light years distant from the earth.

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FORESTRY

Douglas Fir Felled in 1895 Older Than Sequoias

BRITISH COLUMBIA may have sacrificed the distinction of having the oldest tree in the world nearly forty years ago, when the gigantic Douglas fir shown in the accompanying illustration was felled in August, 1895. It stood near Vancouver, but its exact location has been forgotten. Forestry men are now hunting for its stump, so that new measurements can be taken and a ring count made to determine its age.

This fir giant measured 417 feet in height, with a clear 300 feet to the first limb. At the butt it was 25 feet in diameter, with bark 16 inches thick; 207 feet above the ground its diameter was still nine feet.

The old photograph, which shows the feller, George Cary, on the ladder, was obtained through the courtesy of Maj. H. Steere-Clark, of the British Columbia Loggers Association.

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GIANT DOUGLAS FIR MAY HAVE BEEN OLDER THAN SEQUOIAS

PSYCHOLOGY

Temper Tantrums

A New Study of Anger in Children Analyzes the Causes Of Tantrums and Tells What Should be Done About Them

By MARJORIE VAN DE WATER

IT WAS ONE of those informal, but impressive family councils. Tommy had been indulging in temper tantrums.

"He needs a good thrashing. That would take it out of him." This was Grandfather's contribution, a conclusion drawn from a rich experience with six sons. Grandmother was more kindly.

"He has been looking pale lately. Don't you think you should give him a spring tonic?"

"I always made Edward stay in the yard for a week. If you would try that with Tommy, he'd soon get over his tantrums." This was Aunt Edith.

It was followed by an aside from Aunt Ruth—"Ed never did."

Uncle Horace was an idealist—"You should reason with the child. The boy has sense and would respond. If you treat him with corporal punishment, he will respond like a little animal. You should develop his mind."

"I'd just like to see you try to reason with Edward when he was kicking and screaming on the floor," Aunt Edith retorted acidly. She had.

Uncle Joe was the one all the children got on with nicely. His contribution came next.

"You make a whole lot out of nothing, seems to me. Why don't you just divert the child's attention. Give him a new toy or a good big candy sucker, and he'll give up his tantrum any time."

Then it was Grandfather's turn again.

"The trouble with the boy is, he's the only one. If Jenny had a few more to look after, she wouldn't be picking on Tommy all the time. When a boy is never let alone and never given his own way, it's no wonder he has tantrums."

There was no reply to this. Uncle Joe recalled that Grandfather had been like that, thrashing one time and "letting the boy alone" the next, but he said nothing. Jenny at last said:

"Oh, but I have tried all these things, one at a time and all together. I tell you they don't work."

See Front Cover

"That is just the trouble," said Aunt Elizabeth. "You are not consistent."

Wherever children have tempers, and many of them do, these family consultations are likely to recur. There is a certain sameness about the ideas advanced, and a great similarity about the lack of success recorded. The main difference is in the number of relatives willing to give counsel.

Boys Worse Offenders

To aid the harassed parents of such temperish youngsters, Dr. Florence L. Goodenough, of the Institute of Child Welfare, University of Minnesota, has made a scientific study of anger in young children—what are the immediate causes of outbursts, what are the underlying causes, what methods are commonly used to suppress it, and what is the relative success of each method. These she has reported in a new book "Anger in Young Children," published by the University.

Boys are worse offenders than girls in this matter of temper, Dr. Goodenough found. She points out, however, that while this may be, as is popularly supposed, because the girls are naturally milder, it is quite possible that the reason is really that parents have different standards of behavior for the two sexes. Boys are expected to be more unruly—and they are.

Age, too, makes a difference in the frequency of such outbursts. But mothers may take heart—the peak is reached at two years. The average duration of outbursts changes very little throughout the whole first eight years—by far the greater majority of them being all over in less than five minutes, although that five minutes may seem like hours to the unwilling audience. But as the child grows older, the violent part of the "scene" is usually reduced, kicks and screams gradually being replaced by sulking, whining, or brooding over the incident.

What is the fuse that sets off the dynamite of the child's angry emotions? Dr. Goodenough found out just what we all know, that it is the failure of the

child to have his way in one situation or another. But she also found out many interesting and rather surprising points about what these situations most commonly are.

The "eat your spinach" command, for example, is relatively quite unimportant, despite popular opinion. With children under one year of age there was considerable objection to specific kinds of food, but for all ages this cause accounts for only 3.7 per cent. of outbursts. It is also interesting, in view of the modern mother's complaint that her child will not eat, that desire to eat between meals caused quite as many outbursts as did objection to coming to meals.

The most frequent cause of tantrums seems to be a matter of social relationship. It is, after all, quite a problem for the young human to adjust himself to all the complex artificialities of even juvenile society. Quarrels with playmates account for 11.9 per cent. of all the temper fits recorded. Unwillingness to share possessions and desire for someone else's accounts for another 2.9 and 3.8 per cent.

Just as important as the desire for someone else's things is the desire to share in someone else's activities. Little children of 3 years, especially, wish to be included in the play of older children who consider the small sister or brother in the way. And all youngsters have a strong desire to help adults and to be included in the conversation, play, or work of their elders.

Provoked Because Not Understood

The little ones become provoked, too, when they cannot make their needs understood. And a desire for attention is also a factor, especially with the infants under one year.

Aside from these causes which Dr. Goodenough groups as problems of social relationship, two other classifications contain the great majority of the immediate causes of anger. These are closely related—direct conflict with authority, and objection on the part of the child to the establishment of routine habits, such as dressing, combing hair, going to bed, and coming to meals.

With the older children, an important cause of anger was a laudable desire to help themselves. They would become



SOCIAL DIFFICULTIES

—are a principal cause of anger at all ages. Nearly half the outbursts of children between three and four were caused by such maladjustments, principally disagreements with playmates. In the picture Jackie Cooper and Andy Shuford are having "reel" trouble.

enraged when they tried to accomplish some task or stunt and found themselves unable to do it, or when some well-intentioned adult would force upon them undesired assistance.

So much for the immediate causes of anger. But there are other causes that make one child subject to tantrums while another is placid, and that make some days a continual turmoil in even the best-regulated families.

The hour of the day has a great deal to do with the likelihood of outbursts of anger. The greatest number occurred at 11:30 in the morning and 5:30 in the afternoon, times when both hunger and fatigue are getting in their work. And there was a sharp increase observed after 7:30 in the evening. The smallest number occurred from 1:30 p. m. to 3:30, a time which may coincide with the time of the mid-day nap, perhaps showing that all children behave best when they are asleep.

Dr. Goodenough suggests that a light lunch in the middle of the morning and again in the middle or latter part of the afternoon might be of material assistance in reducing irritability, at least in certain cases.

"The greater number of parents in

this group appear to have been rather meticulous in enforcing the rule against eating between meals," she points out.

The health of the child has, of course, a great effect on his tendency to temper. Outbursts occur much more often when the child has a cold or when he is constipated. More outbursts are reported on days following restless nights or nights of bed-wetting. Children who have had previous illnesses are more prone to tempers, although this may be a matter of "spoiling" during the sickness as well as the effect on the physical condition.

Dr. Goodenough made another discovery about tantrums that would greatly astonish and disconcert the family council assembled to discuss Tommy's troubles. The outbursts increase proportionately with the number of adults in the household. The evidence is embarrassing, but clear. One way of helping Tommy is for everyone but Father and Mother to clear out and leave him alone. Visitors in the home also increase the likelihood of tempers, but when the child is taken out to visit or on some exciting excursion the effect is beneficial.

In advising parents what to do to cure or prevent temper exhibitions, Dr. Goodenough has no dogmatic rules. Apparently, the more you study what should be done, the less positive you become about any particular method.

"No One Method"

"No one method can be universally applicable to all children under all conditions; under certain circumstances methods that in general are not to be recommended may be the best possible ones to use," she says.

"As yet we know too little about the springs of human action to render control by rule of thumb either desirable or possible."

Here are some of the things other parents have done:

Methods change with the age and sex of the child. As age advances, the use of physical force, coaxing, diverting the child's attention, and of ignoring the outburst tends to decrease in frequency, and the use of scolding, threatening, and isolation (sending to his room) increases.

Boys are more often bribed, spanked, threatened, and isolated than are girls. Girls are more often treated with the ignoring attitude.

Here are the most effective methods used to bring any single tantrum to a

conclusion: bribery, granting the child's desire, removing the source of trouble, diverting the child's attention, providing a substitute activity, ignoring the outburst, and isolation. If you coax, sooth, reason, or scold, you will usually have to resort to some other method in addition before the storm is over.

Prevention Best

But the immediate effectiveness of a method does not always correspond to its value in training for self-control on similar occasions, Dr. Goodenough points out. Some of these methods are used more often by those parents whose children have frequent outbursts than they are by those whose youngsters are better-behaved in general. These are: granting the child's desire, removing the source of trouble (which Dr. Goodenough remarks seems to be much the same as granting the child's desire), coaxing, and soothing.

Parents of children having few outbursts find the following methods more effective: diverting the child's attention, reasoning, ignoring the outburst, isolation, and scolding.

Threatening is more often resorted to by the first group of parents, and spanking by the second, but the latter difference is small.

The method of giving in to the child or yielding the issue was used much more frequently by those parents having the greater number of outbursts to treat. The difference between this method and that of diverting the child's attention is that the latter was done as soon as the source of trouble arose, the former after a more or less lengthy "scene."

The old adage of an ounce of prevention being worth a pound of cure, applies particularly in the case of childish tempers, Dr. Goodenough has found. A little ingenuity applied before the outburst to head it off will often save the more wearing conflict of wills. It is also better for the child, for it isn't good for his self-esteem to enter into battle and be subdued and it isn't good for discipline for him to find that by grim persistence and sufficiently objectionable conduct he can worst his elders.

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ARCHAEOLOGY

Arrowheads Found With New Mexican Fossils

THE DISCOVERY of man-made objects associated with fossil animal remains, made by road builders working near Clovis, New Mexico, has impelled the Philadelphia Academy of Natural Sciences and the University of Pennsylvania Museum to send to the site Edgar Howard, research associate of the two institutions, to see that full scientific information is obtained before the evidence is destroyed in the course of further road construction.

The importance of this locality was recognized by Mr. Howard in the course of his explorations last summer, when a local investigator, A. W. Anderson, brought to his attention several unusual arrowpoints.

The site was apparently the bed of an ancient lake, long since dried up. Here the animals came for water, and here, it is supposed, the primitive hunters waited to kill them. A considerable number of the distinctive arrowpoints have been picked up in this area. They show a surprisingly high technical quality. Other points of this same type have been found in the Southwest in recent years, the most striking discovery being at Folsom, New Mexico, where the points were found in close association with an extinct species of bison.

Science News Letter, November 26, 1932

PATHOLOGY

Turkey Disease May Have Helped Kill Heath Hens

BLACKHEAD disease, which has long been one of the most troublesome of the turkey raiser's problems, may have been a factor in the wiping out of one of America's most interesting wild birds, the heath hen of Martha's Vineyard off the coast of New England. At last reports, only one male of this species was known to be alive.

The suggestion that blackhead may have helped in the extermination of the heath hen is made by Prof. E. E. Tyzzer of Harvard University, who has been one of the most active of investigators working on the problem of blackhead infection. He states that dead birds found near the keeper's headquarters on Martha's Vineyard showed lesions characteristic of the disease.

One of the tragic things about this fatal infection of the heath hens is that

the birds' own friends may have unwittingly brought it about. Human settlements on the island of course had chicken yards about them, and chickens are semi-immune carriers of blackhead. The causal agent of the disease is a protozoon, which is transmitted by means of the eggs of a parasitic worm. It is thus not necessary for susceptible birds, such as heath hens or turkeys, to be intimately in contact with chickens; if they merely occupy ground on which chickens have previously lived they will become infected.

Other game birds seem to be susceptible to blackhead if they cross the trail of domestic poultry, Prof. Tyzzer states. Ruffed grouse raised in captivity are especially subject to it; captive quail somewhat less so. However, only negative results were obtained from observations on ring-necked pheasants.

It is perhaps worthy of note that the immune or resistant birds, domestic fowl and ring-necked pheasants, are Old-World species, while the susceptible heath-hen, turkey, grouse and quail are native to this continent.

Science News Letter, November 26, 1932

PALEONTOLOGY

Louisiana Oil Well Yields 50,000,000 Year Old Skull

THE BROKEN skull of a little animal that just missed living in the age of the dinosaurs, brought up apparently by accident from a deep oil well in Louisiana, has been given a habitation in the U. S. National Museum in Washington, and a name by Dr. George Gaylord Simpson of the American Museum of Natural History.

The little creature was one of the earliest of the mammals, and lived something over 50,000,000 years ago, in the early paleocene age. It was so remote in time that no living animal can be said to resemble it in any but the most general way.

The skull was brought up when a hollow tool, lowered into a drill hole to recover a broken drill shaft, gouged out a piece of the wall, in which the pieces of bone were lodged. The skull is incomplete, but enough was recovered to make an identification possible.

Other skulls of somewhat similar animals have been known for some time. But this new find is adjudged to stand in a species by itself, and Dr. Simpson has given it the scientific name *Anisomachus fortunatus*.

Science News Letter, November 26, 1932

IN SCIENCE

PALEONTOLOGY

Earliest Known Dinosaur Comes To Harvard Museum

PLATEOSAURUS, the ancestor of all dinosaurs, is "at home" in the Harvard Museum of Comparative Zoology. An eighteen-foot skeleton, the first mounted specimen of this particular dinosaur to be exhibited in any museum in this country, has been received from Germany, where its scattered bones were found in a deposit in Württemberg.

Plateosaurus was apparently a flesh-eater, for the skull is armed with sharp-pointed teeth; yet he was ancestor to the great lumbering herbivorous dinosaurs like *Diplodocus* as well as to the smaller but more active Tyrannosaur tribe. Like the latter group, *Plateosaurus* walked on his hind legs and apparently used his shortened, claw-armed forelegs for holding his prey. His forefeet have five toes, instead of the three of later dinosaurs, but two of the toes already show signs of evolutionary degeneration.

The geologic age of *Plateosaurus* is Upper Triassic. This dates back some 160 million years.

Science News Letter, November 26, 1932

ENTOMOLOGY

European Corn Borer Spread Retarded

WEATHER conditions unfavorable for the flight of the adults retarded the spread of the European corn borer during the past season, so that it added little new territory to the infested area, the U. S. Department of Agriculture has announced. The corn borer area now includes territory as far west as Wisconsin, and extends from the corn-growing provinces of Canada to Kentucky, Virginia and Maryland.

Department of Agriculture engineers have devised special types of farm implements with which farmers in the infested area can clean up their fields thoroughly in autumn, thereby depriving the borer larvae of refuges in which to spend the winter.

Science News Letter, November 26, 1932

EN FIELDS

BIOLOGY

Transplanted Tissues Stick To Ancestral Pattern

A SALAMANDER tadpole can change a transplanted bit of frog body-tissue into a mouth—but it will be a frog's mouth growing on the salamander tadpole!

This is the outcome of an experiment reported at the recent meeting of the Society of German Physicians and Scientists at Mainz, by Dr. H. Spemann of Freiburg. It has produced something of a sensation in German biological circles.

Dr. Spemann was following up a fact that has been known for many years; that body tissues of very young tadpoles can be transplanted freely from one individual to another, or from one place to another on the same individual. What he wanted to find out was how tissue from one animal would behave when grafted on an alien animal and also in a body region widely different from its source. So he took a bit of body-wall tissue from a frog tadpole and grafted it on the mouth region of a larval salamander. The graft took hold and became a mouth for its new owner. But that was as far as it would go; in its toothlessness and other characteristics it remained faithful to its frog ancestry.

Science News Letter, November 26, 1932

MINING-ARCHAEOLOGY

Stone Age Africans Sent Manganese to Egypt

EVIDENCE which convinces him that Stone Age miners of South Africa supplied the Egyptians with manganese, thousands of years ago, has been found by Dr. Raymond A. Dart, professor of anatomy at the University of the Witwatersrand, Johannesburg.

Sophisticated Egyptian fashion called for manganese to adorn the eyebrows of Egyptian women. Manganese also was a cosmetic for giving appearance of life to mummies. Manganese was probably used, too, in coloring glassware.

The strange circumstances of Stone Age men, using no metals themselves, mining manganese for a more advanced

civilization of their own time is believed to be revealed as a result of the discovery of mining implements. The implements of stone were found at Broken Hill, Rhodesia. They show that miners were active in that region between 5,000 and 6,000 years ago, Dr. Dart concludes, and the minerals they extracted, including manganese, were used in distant Egypt.

Dr. Dart has completed his manuscript for a book on the old mines of Rhodesia, in which he places their age at a much older figure than has been generally given. He offers evidence for an antiquity of the period about 3000 to 4000 B. C.

The Stone Age Rhodesian miners worked under supervision of strangers, belonging to one of the contemporary civilizations, Dr. Dart reports. These supervisors came probably from Egypt or Mesopotamia, or else were traders with Egypt. It is possible, he says, that the land of "Punt" in the Bible was the name for unknown southern Africa.

Egypt and Babylon got metals for bronze from ancient workings at Rooiberg in the Transvaal, is another of Dr. Dart's conclusions from his research.

Science News Letter, November 26, 1932

ARCHAEOLOGY

Houses of Dead Painted Like Stage Scenery

HOUSES of the dead, painted like stage scenery, have been unearthed at the famous site of Hermopolis, about 150 miles south of Cairo, by the Egyptian University.

The tombs are two-story houses with stairways, galleries, and chambers where the dead were laid to rest in state. But magnificent marble pillars and stone carvings which adorn the rooms and halls are all just "scenery" painted on the walls. The artist with his paint pot produced make-believe columns and wall facings of green marble, red-flecked marble, yellow, gray, and black marble, all most realistic, in imitation of the ornate villas in which wealthy people lived. Painters' tricks of perspective and light and shade were employed to heighten the illusion of grandeur in the halls of the dead.

The period of the tombs is set at about the second and third centuries of the Christian era. The method of painting architectural features on the walls is pronounced very like that employed in houses of Pompeii in an earlier period.

Science News Letter, November 26, 1932

SEISMOLOGY

Earthquakes Recorded From Coasts of Asia and Mexico

EASTERN Asia got its second severe earthquake within a few weeks when the seacoast region between the Japan Sea and the Gulf of Tartary was shaken by a deep-seated quake on Saturday night, Nov. 12, at 11:46.5 p. m., eastern standard time. A previous quake had shaken the general region of the Amur river valley. Both were located by the U. S. Coast and Geodetic Survey, using data gathered by Science Service. The epicenter of the recent quake was approximately 45 degrees north latitude, 137 degrees east longitude.

An earthquake of medium intensity shook the sea bottom off the Pacific coast of Mexico on the morning of Thursday, Nov. 17 at 1:02.6 a. m. eastern standard time. The approximate epicenter was given as latitude 18 degrees north, longitude 105 degrees west. This is just off the coast of Oaxaca, where severe earthquakes have been felt recently.

Science News Letter, November 26, 1932

PHYSIOLOGY

Heart Muscle Receives Superior Protection

THE HEART MUSCLE has certain protective mechanisms which are apparently inherent and which no other tissues of the human body possess in the same measure, Prof. Carl V. Weller of the University of Michigan, told the National Academy of Sciences.

One of the most obvious of these depends on the pattern of the arterial supply, Prof. Weller pointed out.

These protective mechanisms are of biological significance. They have been developed and perpetuated in order to maintain, as far as possible, the soundness of the heart muscles, so essential for the preservation of the organism.

One example of these protective mechanisms which Prof. Weller called attention to is the comparative freedom of the heart muscle from cancer.

Another example is in syphilis when the big blood vessel, the aorta itself, may be affected without the heart muscle showing much change.

"Perhaps the most striking example of all is found in the inability of young trichinae to encyst in heart muscle, although a defensive myocarditis is produced by them," Prof. Weller said.

Science News Letter, November 26, 1932

GENETICS

New Hormones Show Whether Boy or Girl Will be Born

Secretion From Expectant Mother Injected Into Rabbit Enables Scientists to Predict Correctly in 80 Out of 85 Cases

A SCIENTIFIC WAY of predicting whether the baby will be a boy or a girl has just been developed by two San Francisco scientists, Dr. John H. Dorn of the University of California Medical School and Edward I. Sugarman of the Sugarman Laboratory in San Francisco.

They were able to predict the sex of unborn children successfully in 80 out of 85 cases, they stated in reporting to the American Medical Association.

The method depends on the discovery that the kidney secretion of the expectant mother contains one kind of hormone if the baby is going to be a girl and another kind if the baby will be a boy. When the baby is going to be a girl, this hormone will stimulate precocious sexual development in immature male rabbits. When it is going to be a boy, the hormone has apparently no effect on the young rabbit's sex glands. The test is made by injecting some of the mother's kidney secretion into the rabbit and examining the animal 48 hours later.

Of the five cases in which their diagnoses were incorrect, they explained that in four of the cases, the rabbits used for the test were probably too old and sexual development had already begun. Consequently the changes they found were attributed wrongly to presence of the female hormone, whereas actually the baby was a boy. They were unable to account for the mistake in the fifth case.

The tests were made anywhere between one week and four months before the child was to be born.

Two of the cases were twins, boy and girl in each case. In these, their test showed that a boy would be born. They suggest that the hormone for the boy neutralized the effect of the hormone for the girl, thus leaving the rabbit unchanged and giving reason to believe that a boy would be born, but giving no indication of his twin sister.

"We are reporting our work at this time so that others may repeat it and confirm or disprove our observations,"

the scientists stated in their recent report to the American Medical Association. They expect to continue their own study.

"As the matter now stands, we believe that we are working with true and hitherto undescribed sex hormones," they declared.

Their work suggests that an old theory, handed down by folk lore from the time of Hippocrates, Father of Medicine himself, that each sex carried two hormones in varying degree may be correct after all.

Science News Letter, November 26, 1932

MEDICINE

Forty Thousand Protected Against Spotted Fever

DURING the last eight years over 40,000 people have been vaccinated against Rocky Mountain spotted fever, Dr. R. R. Spencer, U. S. Public Health Service scientist who developed the vaccine, told members of the New York Electrical Society at the science forum.

This protective vaccine, which has proved to be effective in saving lives, is the most effective weapon against this dreaded disease which was first discovered in the mountainous northwestern part of the United States. It is transmitted to man by the bite of the common wood tick or dog tick, and is not limited to the Rocky Mountain area.

Vaccination is limited to persons whose occupations necessarily expose them to tick bites.

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From Page 335

Minnesota maid's bones in June of last year.

He had previously asked road crews to preserve carefully any bones they found in their excavations. Without undue haste the unusually complete skeleton was studied. Then the site was re-dug this year for corroborative evidence, and 355 additional fragments were unearthed.

Geologists were asked to date the layers of the earth in which the Minnesota maid was found. Dr. Frank Leverett of the University of Michigan, authority on glacial geology, discovered the extinct glacial Lake Pelican, in the silt of which the skeleton was found. He dates it as some twenty thousand years old. The great ice age Lake Agassiz existed for ten thousand years before natural processes drained it some eight thousand years ago. The geology shows that the earth packed around the bones of the Minnesota maid was washed in by glacier water several thousand years before that great lake was formed. Other geologists concurred with Dr. Leverett's findings.

If further investigations sustain the Minnesota maid's antiquity, she will be written into history as evidence that a primitive type of *Homo sapiens* inhabited America when men of the Stone Age populated Europe.

Science News Letter, November 26, 1932

PALEONTOLOGY

Field Museum Gets Horned Gopher Skull

THE FIELD MUSEUM of Natural History in Chicago has just received a fossil skull more highly prized than the skull of many a species of giant dinosaur or mammoth would be, although it is only a few inches long. The fossil is extremely rare, only four or five such skulls being known.

It is the skull of a horned gopher, a stout little animal about the size of a woodchuck, which burrowed in the prairies of the West about 7,000,000 years ago, in the late miocene age. The animal had a pair of sharp-pointed conical horns on its nose, which presumably were useful to it in its tunnelling.

Science News Letter, November 26, 1932



Field Museum

PRAIRIE DOGS' FORERUNNERS

CHEMISTRY

Chemical Surface Phenomena

"A Classic of Science"

Langmuir, Nobel Prizeman, Shows That Adsorption Results From Chemical Forces Similar to Those Between Atoms

THE CONSTITUTION AND FUNDAMENTAL PROPERTIES OF SOLIDS AND LIQUIDS. Part 1. Solids. By Irving Langmuir. In *Journal of the American Chemical Society*, Vol. 38, Nov. 1916. Part II. Liquids. Vol. 39, Sept. 1917. THE ADSORPTION OF GASES ON PLANE SURFACES OF GLASS, MICA AND PLATINUM. Vol. 40, Sept. 1918.

THE WORK of the Braggs on crystal structure is reviewed from the viewpoint of the chemist and the relation of this work to theories of chemical constitution such as those of Werner, Stark, J. J. Thomson, and Lewis, is discussed in detail.

It is concluded that the substances whose structures have thus far been studied by the X-ray spectograph are not representative of compounds in general. Only polar compounds have been studied.

Solid polar compounds are, in general, built up of atoms bound together by secondary or residual valence. The whole crystal must be regarded as a single molecule.

Solid nonpolar compounds consist in general of "Group Molecules" in which the atoms are usually held together by primary valence. These group molecules in turn are bound together by secondary valence to form a large "Crystal Molecule," which includes the whole solid mass.

There is no present justification for dividing interatomic (or intermolecular) forces into *physical* and *chemical* forces. It is much more profitable to consider all such forces as strictly chemical in nature. Evaporation, condensation, solution, crystallization, adsorption, surface tension, etc., should all be regarded as typical chemical phenomena. The object of this paper is largely to show that *chemical knowledge already avail-*

able is directly applicable to the study of these phenomena.

From a consideration of such properties as specific heat, compressibility, coefficient of expansion, etc., it is concluded that collisions do not take place between the atoms of solids, but that these move about equilibrium positions under the influence of both attractive and repulsive forces.

The "time of relaxation" of the atoms of solids is calculated approximately from the heat conductivity and is found to be of the order of 10^{-14} to 10^{-7} seconds. An independent method by which the "time of relaxation" can be calculated from the rate of evaporation of a substance in vacuum, gives substantially similar results. Thus the time necessary for an atom of a solid to reach thermal equilibrium with its neighbors is very small compared to the time necessary to make a single oscillation about an equilibrium position. The "oscillations" are thus extremely strongly damped.

Since solid substances in general are held together by secondary rather than primary valence, there are few limitations to the number of compounds that can exist in the solid state. Most of these compounds do not show a composition which could be predicted from the ordinary rules of valence. Metallic compounds, minerals, solid solutions and glasses are discussed from this point of view.

By considerations based largely on the compressibility, it is concluded that the attractive forces between atoms usually reach a maximum intensity when the distance between adjacent atoms in solids is increased by about 0.6×10^{-8} cm. (10-30% of the normal distance between atoms).

Since energy must be expended in breaking apart a solid, the surfaces of solids must contain more potential energy than do the corresponding number of atoms in the interior. Since this potential energy is probably electromagnetic energy in the field between atoms,

the interatomic forces are more intense on the surface than in the interior. This intense surface field of force (unsaturated chemical affinity) is one of the causes of the phenomena of condensation and adsorption.

Because of the small time of relaxation and because an atom approaching the surface is attracted by many, but later is repelled by few atoms, it follows that the surfaces of solids are almost wholly inelastic in regard to collisions of molecules impinging on the surface. There is also a great deal of experimental evidence of this inelasticity. As a result, nearly every molecule or atom striking a solid surface condenses no matter what the temperature may be. While condensed it is held to the surface by forces quite similar to those holding solids together (either primary or secondary valence). At high temperatures evaporation may take place almost immediately after condensation, but at lower temperatures, the condensed atom or molecule may remain indefinitely.

The phenomena of condensation and evaporation (sublimation) of solids is discussed at some length. In general, the rate of evaporation (m) of a substance in a high vacuum is related to the pressure (p) of the saturated vapor by the equation

$$m = \sqrt{\frac{M}{2\pi RT}} p$$

Red phosphorus and some other substances probably form exceptions to this rule.

The mechanism of the dissociation of a solid, such as CaCO_3 , is discussed. It is shown that when, according to the phase

A Famous Patent

of an almost-human machine which is largely responsible for our great daily papers, our flood of modern literature, and for the expression, "etaoin shrdlu,"

THE LINOTYPE

IS THE NEXT CLASSIC OF SCIENCE

Dr. Langmuir's three papers form so connected a whole that we have reprinted here the author's summaries rather than select a portion from any one of them alone. All those interested in surface phenomena, catalysis, or "colloid" reactions of any sort should read the three papers in their entirety, in the files of the J. A. C. S.

rule, separate phases of constant composition are present, the reaction must take place exclusively at the boundaries of these phases. This kinetic interpretation of the phase rule indicates clearly the distinction between reactions in which solid solutions are formed and those in which separate phases appear. This theory offers a ready explanation for the fact that hydrated crystals frequently fail to effloresce unless scratched and for the fact that thoroughly dehydrated substances often absorb moisture with great difficulty.

Adsorption is a direct consequence of the time lag between the condensation and the subsequent evaporation of molecules. The adsorbed substance may be held to the surface either by secondary or primary valence. In either case it is profitable to regard the phenomena as chemical in nature. A large number of experimental results are given which prove conclusively that adsorption is very frequently the result of the strongest kind of chemical union (primary valence) between the atoms of the adsorbed substance and the atoms of the solid.

It is shown that the action of a typical catalytic poison depends on the formation of a very stable film one atom deep over the surface of the catalyzer. The chemical activity of any solid surface depends upon the nature of, the arrangement of, and the spacing of the atoms forming the surface layer. There is a very close relation between the chemical activity of a surface and the electron emission from it (either thermionic or photoelectric emission).

A brief quantitative development of

this theory of heterogeneous reactions is given. A "law of surface action" analogous to but different from, the "law of mass action" is proposed. This theory is in accord with and affords an explanation of Reichstein's "Constant Sum Hypothesis". An outline is given of the application of this theory to heterogeneous gas reactions and to enzyme action.

The second part of this paper will deal with the Structure of Liquids with particular reference to surface tension phenomena. It will be shown that the surface tension of organic liquids is a characteristic chemical phenomena. It depends particularly upon the shapes of the group molecules and upon the relative intensities of the chemical activity of different portions of the molecules. A method will be described (together with experimental data) by which the cross sections, lengths and other dimensions of group molecules may be determined.

Mechanism of Adsorption

According to the theory previously developed, gaseous molecules impinging on a solid or liquid surface do not in general rebound elastically from the surface, but condense on it, and are held or adsorbed on the surface by forces similar to those holding the atoms or group molecules of solid bodies. If these forces are weak the "life" of the adsorbed molecules on the surface is short, so that the number of molecules adsorbed at any time is relatively small. On the other hand, when the forces are strong the rate of evaporation of the molecules may be so slow that the surface becomes practically completely covered by a monomolecular layer of adsorbed molecules. In the present paper this theory is extended and is developed along quantitative lines.

The theory requires that in typical cases of true adsorption the adsorbed film should not exceed one molecule in thickness. This is contrary to the usual viewpoint. The discrepancy is accounted for by the fact that nearly all investigators have worked with porous bodies in which the adsorbing surface is indeterminate or have used nearly saturated vapors so that condensation of liquid occurred in capillary spaces. Others have mistaken solution or absorption for true adsorption.

The mechanism of adsorption is discussed at some length. The forces causing adsorption are typically chemical and exhibit all the great differences in intensity and quality characteristic of chemical forces. The adsorption of so-

called permanent gases by solids usually involves only secondary valence forces. A great many cases of adsorption, particularly by metals, are caused by primary valence forces. Under certain conditions stoichiometric relations should govern the amounts of gas adsorbed on saturated surfaces. These relationships may fail to hold because of steric hindrance effects between the adsorbed molecules.

Equations are developed which give the relation between the amount of adsorbed gas and the pressure and other variables under various assumed conditions. No single equation other than purely thermodynamic ones should be expected to cover all cases of adsorption any more than a single equation should represent equilibrium pressures for all chemical reactions.

Experiments were undertaken to measure the adsorption of several common gases by plane surfaces of mica, glass, and platinum. By using pressures of 100 bars (approximately 0.1 mm. of mercury) or less, small quantities of gas were more easily measured and the danger of condensation of liquefied gas in capillary spaces was avoided.

At room temperature the adsorption by mica and glass was negligible, certainly not over one per cent. of the surface being covered by a single layer of molecules. At -183° and at -118° C., relatively large amounts of gas were adsorbed, except in case of hydrogen. At the higher pressures used, the surfaces tended to become saturated with gas. The maximum quantities adsorbed even with saturated surfaces were always somewhat less than the amounts to be expected in a monomolecular layer. . . . The amounts of the different gases adsorbed by saturated surfaces of mica and glass were always in the following order: hydrogen, oxygen, argon, nitrogen, carbon monoxide, methane, and carbon dioxide.

The amounts of these gases adsorbed by mica and glass varied with the pressure in accordance with Equation 9, which was deduced for the case of simple adsorption. The adsorption of these gases was easily and quickly reversible.

The phenomena observed with platinum were quite different. No adsorption of gases could be observed even at -183° , until the platinum had been "activated" by heating to 300° in a mixture of hydrogen and oxygen at low pressure. After this activation, hydrogen and oxygen or carbon monoxide and oxygen reacted together readily at room temperature in contact with the platinum. The platinum was then found

▼ The Science Service radio address next week will be on the subject,

R **URANIUM AS THE**

A **EARTH'S CLOCK**

by

D **Dr. Alois Kovarik**

I **Professor of physics at Yale**

O **University and member of**

▲ **the National Research Council's Committee on Measurement of Geological Time.**

FRIDAY, DEC. 2

at 12:45 P. M., Eastern Standard Time

Over Stations of The Columbia Broadcasting System

capable of adsorbing oxygen, carbon monoxide or hydrogen. The maximum quantities of oxygen and carbon monoxide corresponded to monomolecular layers. The oxygen could not be driven off either by heat or by pumping. When the platinum was in contact with an excess of oxygen the amount of oxygen adsorbed increased as the temperature was raised, but the action was irreversible. Adsorbed carbon monoxide could not be removed by pumping at room temperature, but at 300° part of it could be pumped off. When oxygen was brought in contact with carbon monoxide adsorbed on the platinum it reacted rapidly to form carbon dioxide,

which at room temperature showed no tendency to be adsorbed on the platinum. In a similar way carbon monoxide brought into contact with adsorbed oxygen reacted immediately. These cases of adsorption are clearly due to chemical forces of the primary valence type.

Further work needs to be done to determine the cause of the activation of the platinum.

In conclusion, the writer wishes to express his appreciation of the valuable assistance of Mr. S. P. Sweetser, who carried out the experimental part of this investigation.

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ASTRONOMY

Earth Apparently Missed Main Leonid Meteor Swarm

FEARS of astronomers that the expected display of Leonid meteors might again fail to appear as it did in 1899 have been justified.

From the Flower Observatory of the University of Pennsylvania, of which he is director, Dr. Charles P. Olivier, president of the Meteor Commission of the International Astronomical Union, observed these shooting stars at the rate of thirteen per hour, during the early morning hours of Wednesday, Nov. 16. Correcting for the proximity of the bright moon, this would mean that about thirty might have been seen every hour after midnight had the sky been dark. This is far inferior to the display of last year, which it was hoped might be the forerunner of a brilliant shower this month, possibly rivalling that of 1866.

One Was Persistent

The midwestern display of Leonid meteors was disappointing, Prof. James Van Allen of Iowa Wesleyan College at Mt. Pleasant, Iowa, reported. Bright moonlight hampered observations. Relatively few meteors were seen; one, however, left a trace that lasted fifteen seconds. The largest single count, by an observer facing the radiant or center of meteor flight, was 46 during the period from 2:30 to 5:00 A. M.

In the Southwest, observing conditions were also unsatisfactory, Prof. C. C. Wylie of the University of Iowa reported. Prof. Wylie had led an expedition to the neighborhood of Flagstaff, Ariz.

Heavy clouds blanketed the sky, rendering the astronomers' vigil almost useless for scientific purposes. However, many spectacular meteors seen through the clouds verified the prediction that the shower would start at that time.

It seems probable that the damage done to the meteor swarm by Jupiter before 1899, in pulling aside the center part so much that it missed the earth, though the beginning and end reached us in 1898 and 1901, has not yet been repaired. It had been thought that Jupiter might since have pulled the swarm into line again.

Thus it seems likely that 1933 may also be deficient in meteors of the Leonid swarm, but that in 1934 we may have one like last year's. Or we may have a shower like that of 1901, when the meteors fell at the rate of more than a hundred an hour.

But Dr. Olivier again emphasized the uncertainty of predicting meteors' behavior, since we only see them in their dying moments, and unlike other astronomical bodies cannot observe them over a large part of their orbits.

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In Massachusetts, where vaccination against smallpox is compulsory, there were 408 cases of smallpox from 1919 to 1928; in Arizona, Utah, Minnesota, and North Dakota, which have a total population about equal to Massachusetts, there is no compulsory vaccination and there were 46,130 cases of smallpox in the same period.

PHYSIOLOGY

Yellow Dextrin Found Harmful To Mice

A PARTIALLY digested food may be more harmful than a non-digested one, it appears from recent experiments by Prof. Lillias D. Francis and Dorothy F. Johnson of Wellesley College, Wellesley, Mass.

Dr. Francis and Miss Johnson found that the use of yellow dextrin, an intermediate product in the digestion of starch, in the dietaries of her mice was followed by severe diarrhea, loss of weight, and finally death. If, however, the dextrin was replaced by starch, the more complex carbohydrate from which the dextrin may be derived, the mice did not develop any abnormal symptoms and thrived. Not only that but if, after the animal was suffering with all of the typical symptoms of this "dextrin poisoning," starch was substituted for dextrin in the diet of the animal, it was cured. A return to the dextrin-containing diet at any time was always accompanied by a return of the diarrhea.

The degree of the "toxicity" of the dextrin seemed to be dependent upon the amount of it used; thus, if 38 per cent. dextrin was used as the source of carbohydrate in an otherwise adequate diet the mice suffered for five to eight days and then recovered. If 52 per cent. dextrin was used the animals suffered a great deal more and if 70 per cent. was used they lived only a few days. All control animals on similar diets but with corn starch instead of dextrin were quite normal. About 68 animals of three different ages have been tested so far.

The cause of the death, according to Dr. Francis, is not known. She has found that the caecums of the affected animals are distended by gas to almost 300 per cent. of their normal size and she has suggested that there is a possibility that a changed bacterial flora in the intestine may have been induced by the imposed dietary regime.

"It is also very interesting that young mice are more susceptible to the deleterious and lethal effects of dietary dextrin than are adult animals," says Dr. Francis. "We are investigating the condition and hope to be able to offer an explanation for it in the near future. It is particularly interesting that this seems to be the only evidence of dextrin's having such a harmful effect."

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PHYSICS

Unit Particles of Matter May Have Varying Charges

THE ATOMIC building blocks of unit mass, known as protons and neutrons, may have electrical charges upon them that vary in magnitude from six times the famous "e" charge to no charge at all as is true of the neutron.

This is suggested by Dr. M. Delbruck of the Wills Physical Laboratory of the University of Bristol, England, in a communication to *Nature*.

The charge "e" is that found negatively on the electron and the positive charge normally on the proton, or positive electron, is of the same magnitude but of the opposite or positive sign.

Dr. Delbruck suggests that unit particles may have arbitrary, positive and negative values of charge which under the quantum theory may vary only by multiples of "e."

This new suggestion may explain, in Dr. Delbruck's opinion, the secondary radiations of high energy and ionizing

power that cosmic rays produce when they smash into the atmosphere. These extremely vigorous radiations have been detected along the tracks of cosmic rays both in America and Europe. Dr. Delbruck considers them likely to be particles of mass one and charge between five and six times "e."

He believes the highly charged unit particles may also explain the puzzling fact that cosmic ray particles are absorbed largely high in the earth's atmosphere. He visualizes unit cosmic rays as particles of mass one created in interstellar space with high positive charges. These do not collect electrons for compensating their charge until they enter the earthly atmosphere. There they pick up electrons and lose part of the charge. The ionizing power thus decreases due to loss of charge, rather than because of reduction of number of particles as it is now assumed to be the case.

Science News Letter, November 26, 1932

MEDICINE

Synthetic Anemia Produced By "Ginger Jake" Poison

RESEARCH which disclosed the cause of "ginger jake" paralysis may also shed light on the cause of certain obscure nervous diseases and even possibly infantile paralysis. So Dr. M. I. Smith of the U. S. National Institute of Health, has reported.

The "ginger jake" paralysis which afflicted a large number of people in the Midwest and Southwest two years ago was caused by adulteration of the Jamaica ginger beverage with a compound known technically as tri-ortho cresyl phosphate. This compound had never been known medicinally but had never been studied pharmacologically. It had been used for many years as a plasticizer in industry.

After discovering that it was the cause of the paralysis epidemic, Dr. Smith and associates proceeded to investigate the compound further. The

fact that it is closely related to carbolic acid and other phenolic compounds widely used in medicine demanded a more intimate knowledge of its effect on the animal body, Dr. Smith explained.

A number of compounds more or less closely related chemically to tri-ortho cresyl phosphate have been studied at the Institute. One of these compounds was found to attack specifically certain well-defined conducting tracts in the spinal cord. It produced a degeneration comparable to that of pernicious anemia and to such conditions as locomotor ataxia. Another compound produced injuries to the central nervous system not unlike those of infantile paralysis.

Further investigation will, Dr. Smith believes, give a clue to how similar injuries and degenerations take place in an illness like infantile paralysis, and may even point the way to curative measures.

Science News Letter, November 26, 1932

BOTANY

NATURE RAMBLINGS

by Frank Thone



White Pine

WHEN the Pilgrims landed on the stern and rock-bound coast of New England, they found two principal foes to fight. The Indians were inclined to be friendly at first, but the forest never was. The heritage of our ancestors had to be hewed out of the forest by hand, and for long the forest always threatened to return as soon as the ax gathered the first flecks of rust.

But now, even as we incline to romanticize over the banished Indian, we also mourn the departed forest. The great pine wilderness our fathers fought finally surrendered and went down in crashing defeat. And then we realized that we had fought the pines too long, and that in slaying almost the last of them we were destroying creatures that were no longer enemies but useful servants. Now we wish we had the white pines back, but they do not come back. In their place come weedy members of the yellow pine tribe, not nearly so valuable nor so beautiful. White pines have to be planted and coaxed to live.

And even then they may not survive. To crown our self-made misfortunes, the white pine blister rust has come. This terrible tree disease has run wild in the remnants of the once great white pine forests, and threatens to wipe out what is left of the species, and it has already gained a foothold among the pines of the Pacific Northwest. It finds an ally in the almost universally distributed wild currants and gooseberries, for it lives part of its life on their leaves, before shifting over to the pine. In places where the white pine is of more value than the plantings of small-fruits, the currants and gooseberries of the gardens and orchards are being rooted out wholesale in an effort to stop this plague.

Science News Letter, November 26, 1932



HOW MUCH are you going to spend for Christmas gifts this season? Good friends must be remembered in an appropriate manner. But economic conditions have made it necessary for most of us to spend less money on their presents.

For those who want to make gifts in 1932 that will be as useful and as appreciated as their remembrances of past years, but who find that they have less money to spend, SCIENCE NEWS LETTER has a suggestion that is bound up with sensible economy.

Why not send SCIENCE NEWS LETTER to many of your friends on the Christmas list? As the only weekly magazine that interprets science for the layman, SCIENCE NEWS LETTER has an unusual and wide appeal. And we have arranged to make it even more welcomed as a Christmas gift.

Gift magazines ordinarily arrive in drab wrappers some time after Christmas, announced only by a card. But this is not true of SCIENCE

NEWS LETTER, for the first copy of your subscription will reach the recipient by special delivery mail right in the midst of the excitement of Dec. 25. And it will be wrapped in a crinkly-paper, holly-green Christmas box and will bear a silver and firecracker-red card with your name on it. The picture above shows just how your gift SCIENCE NEWS LETTER will be received.

After making the wrapping and the manner of delivery as acceptable for Christmas as the contents will be 52 times during the year, we assured ourselves that the price will fit economy budgets. A single subscription to SCIENCE NEWS LETTER is \$5, but if you enclose in your envelope two or more subscriptions the price will be only \$3.50 each. Gifts of such great value as 52 copies of SCIENCE NEWS LETTER for only \$3.50 are indeed rare.

Go over your Christmas list now. Check the names of those for whom SCIENCE NEWS LETTER is a suitable gift. Write these names and addresses clearly on the coupon and mail it today.

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•First Glances at New Books

Physiology

THE HEART RATE—Ernst P. Boas and Ernst F. Goldschmidt—*Thomas*, 166 p., \$3.50. This monograph gives the results of continuous observations with the cardiometer extending over many hours in each case, of the heart rates of 356 individuals. Especial attention was given to the study of the heart rate during sleep, although there are also sections on the heart rate during daily activities, under anesthesia, and in certain diseased conditions.

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Psychology

BEHAVIOR ASPECTS OF CHILD CONDUCT—Esther Loring Richards—*Macmillan*, 299 p., \$2.50. A book on child training which will aid the parent in bringing out the best in the individuality while at the same time fitting the youngster to become a part of the adult group without the friction that so many experience.

Science News Letter, November 26, 1932

Mining-Metallurgy

TREATING GOLD ORES—T. G. Chapman—*University of Arizona*, 32 p., 10c. In the western part of America there has been a revival in gold mining because the purchasing power of gold has so greatly risen. This small bulletin has been prepared to give information to those seeking deposits of gold ore in Arizona.

Science News Letter, November 26, 1932

Astronomy

ASTRONOMY FOR YOUNG FOLKS—Isabel Lewis—*Duffield & Green*, 337 p., \$2. The revised edition of a reliable and readable book on general astronomy.

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Evolution

SURVIVAL OF THE FITTEST—Henry Smith Williams—*McBride*, 321 p., \$3.50. Early Darwinism of the most naive kind, with many exceedingly bad drawings.

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Psychology

PURPOSIVE BEHAVIOR IN ANIMALS AND MEN—Edward Chace Tolman—*Century*, 463 p., \$5. Dedicated to "M.N.A.," that tireless worker in the interests of science, the laboratory animal known as *Mus norvegicus albinus*, this work represents the author's "experimental interest in animal learning grafted upon an arm-chair urge towards

speculation." It presents a new system of psychology based on behavior research.

Science News Letter, November 26, 1932

Medicine

THE CURATIVE VALUE OF LIGHT: SUNLIGHT AND SUN-LAMP IN HEALTH AND DISEASE—Edgar Mayer—*Appleton*, 175 p., \$1.50. In this small book, Dr. Mayer tells simply and clearly what everyone wants to know and needs to know about light. The values and dangers of sunbathing, the proper use of sun-lamps and the kind to be used at home, the use of light in treating tuberculosis and other diseases, are among the topics covered. Numerous diagrams add to the clarity of the text.

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Sociology

CHILD LABOR—White House Conference on Child Health and Protection—*Century*, 560 p., \$5. Here for the first time are all the essential facts about child labor in this country, worked into shape to be of use to social workers, legislators, economists and good citizens generally. During the coming generation, with a surplus of adult labor made available by technological advances, we shall be more interested than ever in eliminating child labor wherever possible, and this book will be the point of departure for much of our effort.

Science News Letter, November 26, 1932

Anthropometry

THE ANTHROPOMETRY OF THE AMERICAN NEGRO—Melville J. Herskovits—*Columbia University Press*, 280 p., \$4. Dr. Herskovits has made a careful anthropological study of nearly 6,000 American Negroes. His results will be of interest not only to anthropologists but to students of social science as well.

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Electricity

PRACTICAL ELECTRICITY FOR BEGINNERS—George A. Willoughby—*Manual Art Press*, 104 p., \$1. The second edition of a concise text and manual which treats electricity as applied to lighting, doorbells, and automobiles.

Science News Letter, November 26, 1932

Forestry

FOREST COVER TYPES OF THE EASTERN UNITED STATES—*Society of American Foresters*, 48 p., 50c. This publication, drawn up by a special committee of the Society of American Foresters, has established 97 distinguishable types of forest covers in the eastern United States. These are fully described, with both dominant and accessory species, types of habitat are given, and estimates of economic importance stated. Published originally in the *Journal of Forestry*, this report is of such importance to foresters, ecologists and plant scientists generally that separate distribution is well justified.

Science News Letter, November 26, 1932

Zoology

THRILLS OF A NATURALIST'S QUEST—Raymond L. Ditmars—*Macmillan*, 268 p., \$3.50. Ditmars has had such a grand good time chasing snakes and things all his life long that he is able to infect his audience with some of the "kick" he gets out of it. And he shows that it isn't necessary to go to the tropics to get a thrill: the field anecdotes that tumble over each other through this book are as much of the backdoor woods as they are of Quetzalcoatl's jungles.

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Zoology

WHO'S WHO IN THE ZOO—Marjorie Barrows—*Reilly and Lee*, 60 p., \$1. There couldn't be a better Christmas present book for a bright eight- or nine-year-old than this. There are a lot of beautiful big colored pictures of assorted mammals and birds by Milo Winter; the text descriptions are lucid, readable and truthful, and the arrangement is such that finding the animal's name becomes an interesting game of hide-and-seek.

Science News Letter, November 26, 1932

Psychology

WHY BE AFRAID—Leon Mones—*Stratford*, 103 p., \$1. Fear, and the psychoses it engenders, are looked at from the behavioristic standpoint, and the prescription to end fear is simply to supplant that kind of behavior with another kind.

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